P
S405
K5
no. 1
Biological & Medical Serials

HORSES

[Publications]

KHAKI UNIVERSITY OF CANADA
Series 1.—No. 1.

1918

PRACTICAL HORSE-BREEDING

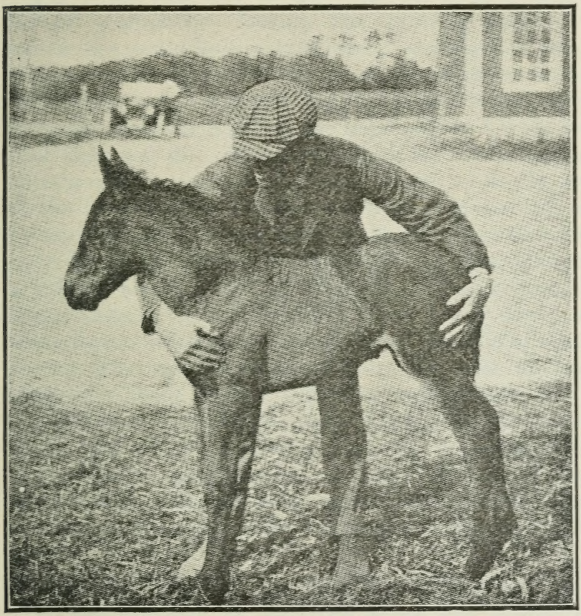

FIG. 1.—*Catching and holding a young foal.*

Reprinted, with adaptations, from "PRACTICAL HORSE-BREEDING," *by M. W. Harper,* "*Cornell Reading Courses.*"

J. C. KING, LTD.
Printers and Stationers,
42–60, Goswell Road.
London. E.C. 1.

PRACTICAL HORSE-BREEDING

M. W. Harper

For about one half of the year the farmer uses his horses constantly. During the growing season the horses are sometimes overworked, whereas for the remainder of the year the cost of maintaining the animals often exceeds the value of their services. Such is likely to be the case when horses are kept merely for the work that they can do. There are many successful farmers, however, who maintain sufficient horses to do the work of the busy season without overwork. Mares are kept by such farmers, and in order to make them earn their keep during the idle season they are bred, thus producing a colt in addition to the work that they accomplish. Thus, instead of purchasing a team every few years, these farmers derive an income from the sale of surplus stock. The money obtained from the sale of horses that have been raised will fully compensate for the maintenance of all horse stock during the idle season. There are many successful farmers, however, whose practice is to maintain an adequate number of mares for the work of the growing season, and to breed them in order that they may earn their support during the idle season.

SELECTION OF BREEDING ANIMALS

In the selection of breeding stock, the principle of heredity that " like produces like " must not be forgotten.

This principle applies to the brood mare as well as to the stallion. Inferior qualities possessed by the mare are as likely to appear in the colt as are inferior qualities possessed by the stallion. The influence of the mare in the transmission of qualities to the foal is often much underestimated, and frequently is ignored entirely by horse-breeders. The general appearance and the pedigree of the stallion are given much prominence, while in the brood mare they are sometimes entirely lost sight of. The farmer who keeps worthless mares for breeding merely because he cannot sell them will not be able to compete with his neighbour who keeps only the best brood mares, even though they both patronize the same stallion. Occasionally an inferior mare may produce a fine colt, but no man can afford to breed horses for the exception.

In breeding horses it is a serious, but common, error to suppose that the bad points in one animal can be fully offset or overcome by the good points in the mate. The popular statement that the stallion controls outward characters and the mare internal characters of the offspring has led many breeders to think that the offspring will resemble the paternal parent irrespective of the mother. Such is not the case. Errors in conformation are not to be offset by choosing a mate that is abnormally developed in the corresponding character. The foundation principle of successful horse-breeding is to mate two animals both of which are as nearly perfect as possible.

The stallion

In selecting the stallion, there are three important factors to be considered: first, the individual merit, or the perfection of the animal as a representative of its type or breed; secondly, the pedigree, or the purity

of the ancestry and the probable capacity of the individual to reproduce itself or to show improvement ; and thirdly, the suitability of the two individuals to be mated.

In breeding horses the perfection of the animals selected should be carefully considered. Occasionally stallions are selected on the basis of their pedigree. Such practice may prove disappointing, for many inferior individuals are recorded merely because such animals command a good price on the market. In choosing breeding horses each animal should be closely inspected, and only superior individuals should be placed in the stud.

Purity of ancestry is an important factor in choosing the stallion, for the capacity of a horse to produce superior offspring will depend largely on his ancestors. Often it is a question which factor should receive a larger share of attention, the individual merit or the pedigree. Formerly great length of pedigree was associated with breeding quality, but the present evidence goes to show that it is the immediate ancestors that are of most importance.

Lastly, in order to be suitable for mating, two animals should be as nearly alike in general characters as it is possible to select ; otherwise the outcome of a union cannot be foretold. Since no two horses are exactly alike, the outcome is likely to be an average between the characters of the parents and what it is desired to obtain in the offspring. When the offspring shows good qualities the mating is considered a fortunate nick ; when there is no resemblance to either parent, but to some near ancestor, the recurrence is called atavism ; and if to some of the far-removed ancestors, it is called reversion. These latter two terms are often used interchangeably. The success of a horse-breeder often

depends on his ability to mate animals properly. Some persons become very skilled in such matters.

The mare

No matter what type or breed is selected, the brood mare should be of good size for the breed to which she belongs. Her conformation should be rather open. The head should be fine and feminine in appearance and the neck should be thin. The shoulders should slope well into the back, and the withers should be high rather than low. The back should be rather short, with a somewhat long underline. The ribs should be well sprung and rather open. The hips and the short ribs should not approach each other too closely. The hind quarters should be broad and deep. The pelvic region should be broad so as to insure ease of foaling. The legs and feet of the brood mare should be especially noted. The bones of the limbs should be clean and free from coarseness, so that the legs appear wide and flat. The tendons should be prominent and free from meatiness, and the hair should be fine, silky and glossy.

It is of great importance that the brood mare be free from all forms of unsoundness or disease that is hereditary or communicable to the offspring. Many breeders have fallen into the error of considering any broken-down, halt, maimed, blind, or otherwise unsound mare fit for breeding purposes when no longer able to work. Blemishes that result from accident are not hereditary nor transmissible and do not render the mare unfit for breeding. The greatest possible care must be exercised, however, in deciding whether the blemish is the result of accident or is an inherent deficiency.

Furthermore, it is desirable that the brood mare shall have a good disposition. Infirmities in temper seem to

be readily transmitted to the offspring. Moreover, pregnant mares are often quarrelsome, and distressing accidents may occur when the mare has a naturally vicious disposition.

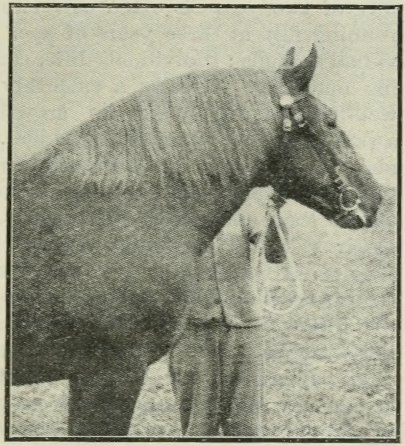

FIG. 2.—*Head of Percheron, showing character.*

While absolutely perfect mares can rarely, if ever, be found, and few farm breeders can afford to reject a mare for small and unimportant defects, yet it would be a great advantage to each horse-breeder and a boon to the horse-breeding industry if all actually unsound and notably unsuitable mares were rigorously rejected when breeding stock is being selected.

PRODUCTIVE PERIOD IN BROOD MARES

The most fertile period in the mare's life is usually at four to twelve years of age. In exceptional cases this period may begin at an earlier age and last longer. Occasionally a filly will breed freely at two years of age, thus foaling her first colt at three ; and not unfrequently mares breed when past twenty years of age.

Breeding two-years-old fillies

The advisability of breeding a two-years-old filly depends on at least three important factors: *First*, the breed: Horses of draught breeding mature much earlier than do lighter and more active breeds, so that a draught filly of two years is often as forward as a trotting or running filly at three years of age. *Secondly*, the individual animals: Individuals differ considerably in attaining maturity. Usually a smoothly turned, neat, and well-finished filly makes its growth earlier than does a rougher, more vigorous individual. Feeding and care also have much to do with the early maturity of the filly; one that is kept growing continuously will mature earlier than one that is imperfectly cared for and that receives a setback each winter. *Thirdly*, the object sought: If the breeder is endeavouring to improve the strain, he should never attempt to breed a two-years-old filly. On the other hand, when draught horses are wanted merely for marketing there is no reason why fillies cannot be bred at two years of age, provided they are mature and have been well grown, and their owner is willing to feed and care for them properly during their pregnancy. Nor is there any reason why they should not be bred each year thereafter. They should not be put to work, however, until past three years of age.

Breeding aged mares

At about twelve years, the reproductive powers of some draught mares begin to wane, although many mares are reliable breeders to about fifteen years, especially if they have been bred continuously from their maturity. Above this age it is rarely profitable to keep them for breeding. Perhaps it is best to dispose of draught brood mares at ten or twelve years of age unless

they are exceptionally good breeders, in which case they should be kept as long as they will breed.

SEASON OF THE YEAR IN WHICH TO BREED

Mares breed naturally in early spring. At this season their breeding condition is more readily observed, and they more frequently conceive than at any other time during the year. The spring of the year is the natural breeding season ; but, because of the heavy spring work, it is necessary on many farms that mares be bred so as to have the colts come in the fall.

Spring foals

When convenient, the spring is the desirable time to breed the mare. This season has many advantages. Not only is the mare's breeding condition more readily noted, but her chances of conceiving are much greater and the foal comes at a time when it is much more easily managed. The housing is simplified ; if the weather is warm, the mare and the foal may be turned into a small paddock or a pasture. If the mare is worked during the day, she should be fed her evening meal before going to pasture, since she needs nutritious food, and grass is too succulent to meet the demands made on her system.

The grass that she eats will serve to keep her in good physical condition and to stimulate the flow of milk. This practice gives the foal the range of the field, so that it may take the much-needed exercise without which no foal can develop endurance. Soon the foal will learn to nibble the grass, and this will prove beneficial, for grass is a good supplement to milk for a suckling colt. If the foal is given a little grain at the same time that the dam receives her ration, it will thrive and develop more quickly than will a fall colt.

Aside from the inconvenience of the foal while the

dam is being worked, the chief objection to a spring colt is that it must be weaned in the fall just about the time of going on dry feed. At this time the colt must receive

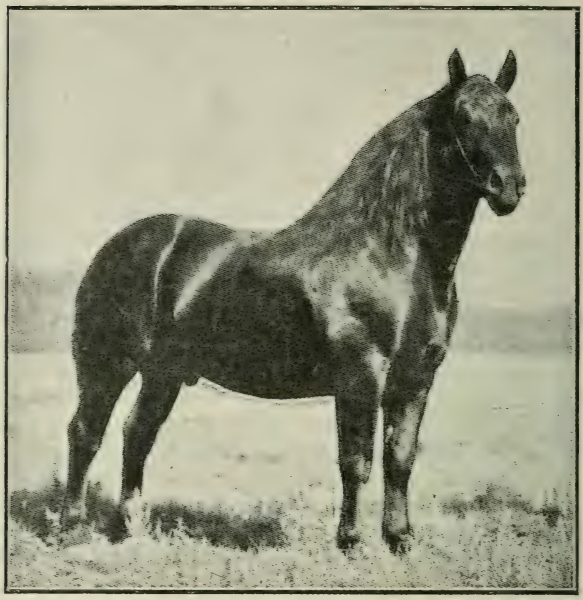

FIG. 3.—*Percheron stallion, showing character.*

extra feed and attention, or it will lose flesh, and its future development and usefulness may be retarded.

Fall foals

On grain farms, the heavy work begins in March and continues until August; in dairy districts, where much hay is to be harvested and many silos are to be filled,

it may last until October. When fall foals are to be raised, the mares should be bred so as to foal as soon as convenient after the season's work, provided the foals do not come when flies are especially annoying. The time of breeding and other details will be modified by circumstances.

While the mare is not so likely to breed in the fall as in the spring—due, in part at least, to her thin condition after the summer's work—yet, by increasing the food, especially the grain ration, by blanketing and by moderate and regular exercise, the desired results can often be attained. The bowels should be kept free from constipation by feeding moderate amounts of succulent food. Conditions should be made as spring-like as possible.

If the foal comes in the winter it will need extra warm quarters and extra attention. The dam will need milk-producing foods, such as clover or alfalfa hay, oats, bran and a few carrots if they are available. She should be exercised regularly. If the breeder feeds succulent food, such as carrots, and provides sufficient exercise for mare and foal, it is possible to raise a winter colt that will be a strong rival to the average spring colt.

BREEDING THE MARE

The habits of the work of a mare should not be changed at breeding time, but she should be used as she was before the service. Often, work mares are bred and then turned into pasture. This is a poor practice, since the sudden change from dry grain and hay to pasture, and from work to idleness, will so upset the system of a mare as to render conception difficult. In like manner, a change from the pasture to a diet of hay and grain will have a similar result. The quieter a mare is kept at time of service, the better it will be for her. If possible,

long drives to and from the stallion should be avoided. When it is desired to breed to a stallion located at some distance, arrangements should be made to leave the mare near him for a time.

Breeding condition

While mares differ widely in the recurrence of their breeding condition, this difference is not so great as to render a general rule inapplicable. A mare bred on the ninth day after foaling will usually conceive; if she is healthy and has received no injuries in giving birth, it is good practice to breed her at this time. When she should be returned in order that it may be determined whether or not she has conceived, is a much-discussed question, owing to the fact that mares differ in this respect. The horse-breeder should make a study of the individuality of his mares so as to return them at the proper time. In common practice the mare is returned on the twenty-first day after the first service, and every seven days thereafter for at least one month, particularly when the mare is valuable and the owner wishes to make sure she is in foal.

Some mares are shy breeders and are never observed to be in breeding condition. If it is desired to breed such a mare, occasionally it can be accomplished by hoppling her securely and then breeding her. In approximately three weeks from this service she may be observed to be in breeding condition, when she should be bred again. On the other hand, there are many mares that will freely be served even when in foal, in some cases up to the time of foaling.

Sterility in mares

Often it happens that mares are served normally and yet fail to conceive. Some of the causes of this difficulty

are readily understood and easily prevented, while others are not so well understood and perhaps are beyond the control of breeders. Mares that are not served until late in life are often difficult to impregnate for the first time. This is often noticed in mares that have spent a good part of a lifetime at hard work. In such

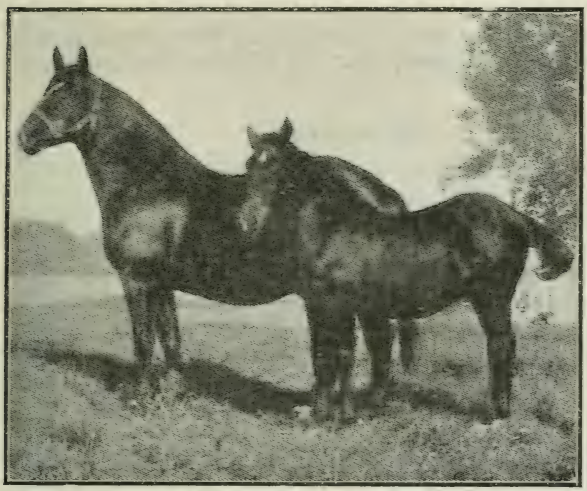

FIG. 4.—*Percheron mare and yearling colt.*

cases it is due perhaps to the long inactivity of the generative organs. An excess of rich and stimulating foods is a common cause of non-breeding. This is undoubtedly one of the most frequent causes of barrenness, and the dangers attending parturition are more than trebled in the case of fat animals. Milk fever

never occurs in mares that are kept actually at work and are in only moderate flesh at the time of foaling. On the other hand, barrenness may be due to poor feeding and hard work, the system being weakened by the lack of sufficient nutrition. Undue sexual excitement at the most active stage of heat is often responsible for the non-conception of the mare. In addition, there are many causes of barrenness in mares over which the breeder has little or no control, such as derangement of the female organs, diseased ovaries, tumours, and the like.

Abortion in mares

Abortion is the expulsion of the fœtus at any time from the date of impregnation until the foal can survive out of the womb. It is produced by any cause operating to disconnect the union of the fœtal membrane with the uterus. The mare may abort by reason of almost any cause that disturbs her system generally, such as the influence of too stimulating a diet or the reverse, wet seasons, a previous miscarriage, and all circumstances opposed to efficient nutrition and respiration. The more direct mechanical causes are falls, blows, violent exertion, severe illness, large draughts of cold water, or the eating of iced grass, the ergot of rye, the smut of corn or other grain, and the drinking of filthy stagnant water; also travelling on heavy, muddy roads or on soft ploughed ground, or jumping over fences, ditches, and the like.

The prevention of abortion is the avoidance of all causes that may have a tendency to produce it. When abortion has once occurred, the greatest care in subsequent management is necessary. The breeder must avoid all practices that may cause constipation, diarrhœa, or indigestion. When all measures fail and miscarriage

results, all that can be done is to assist in the removal of the fœtus and its membranes as in ordinary parturitions. The mare should have special care at this time. She should have a roomy, well-lighted stall, plenty of air, and easily digested food. The mare should not be served again for a month or longer, and in no case until after all discharges from the vulva have ceased.

The pregnant mare

The pregnant mare should receive such a ration as will supply her demands for energy and, in addition,

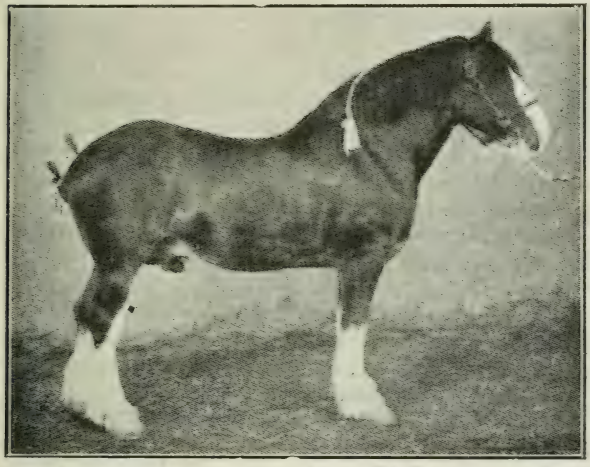

FIG. 5.—*Clydesdale stallion, showing character.*

allow ample nourishment for the development of the foal, both before and for a short time after birth. Her work should be so regulated as to protect her from be-

coming tired, overheated, or injured in any way. There is no secret in raising colts further than feeding to the mother a moderate amount of nutritious food and providing sufficient exercise to keep mare and foal in good physical condition.

Working the pregnant mare.—Moderate work is not only harmless, but positively advantageous, to mares in foal, provided proper care is taken not to overload them. It is much better to work them than to keep them tied in the stable in want of exercise, or to permit them to run at large in the fields with other horses where they are exposed to accident resulting from racing, playing, or fighting with each other. Pregnant mares are usually quarrelsome, and abortions frequently occur from injuries received at the heels of other horses. If proper care be taken, the mare can safely be used at the ordinary work of the farm up to the very day of foaling; but as the time approaches it is important that the work be not heavy or the pace rapid. She must not be fretted by the other horse or by rough, inexperienced hands.

Feeding the pregnant mare.—The food of the pregnant mare is most important. Many persons fail of success in horse-breeding by depending on blood alone to improve the stock. They forget that all of our improved breeds of horses are the product of adequate nutrition as well as intelligent breeding, suitable environment, sufficient shelter, and kindly care.

The quality of the ration is of as much importance as the quantity. Fat production is to be avoided, and the formation of blood, muscle, and bone should be induced. Foods rich in protein and ash, such as oats, bran, clover, and alfalfa, are preferable to starchy foods, such as corn. A very good ration for the pregnant mare is as follows: four parts ground oats, four parts

wheat bran or its equivalent, and one part linseed meal by measure, with bright clover or alfalfa hay for roughage.

Pregnant animals have a tendency to fatten as pregnancy advances. This tendency must be guarded against in the mare, since superfluous flesh may interfere with the development of the foal, cause abortion, or induce difficulties at parturition, such as milk fever and garget. The ration of the mare should be reduced just before foaling and for a short time thereafter, and should be made laxative by the addition of a succulent food, such as carrots, or an occasional bran mash. This practice should be continued until both mare and foal have recovered from the ordeal incident to birth.

Parturition

The average period of gestation in the mare is popularly placed at eleven months—more accurately, perhaps, three hundred and forty days; but the time may vary greatly. Because of the uncertainty of the period, the mare should be closely watched from the tenth month until parturition. There are certain indications of the near approach of parturition that rarely fail. Often the udder becomes greatly distended for some time before foaling, but the teats seldom become full and plump to the end earlier than two or three days before the foal is born. About a week or ten days before foaling, there is a marked shrinking, or falling away, of the muscular parts at the top of the buttocks, in back of the hips. Another indication is the appearance of the wax at the ends of the teats. This generally appears not earlier than three days before the foal comes. Occasionally, however, the foal may be born without any of these signs.

From about the three hundred and thirtieth day,

or when the characteristic symptoms begin to appear, the work should be much lightened and the grain ration should be reduced, although for the best results the mare should be kept at light work up to the day of foaling. Bran mash will prove very beneficial now, since it will keep the bowels in good condition and will allay any tendency to feverishness. The mare should have a roomy, well lighted, and well-ventilated box stall, thoroughly clean and freshly bedded.

During the night it may be necessary that a caretaker be near at hand in order to render assistance if need arises, but the mare must not know of his presence. Most mares will not give birth to their young in the presence of persons if they can help it.

If birth is easy and normal, both mare and foal should be let alone. They will come through the ordeal safely. If, after a reasonable time, the mare shows that she cannot deliver the foal, or if examination discloses that there is an abnormal presentation (normally the forefeet appear first, then the nose), a veterinarian should be summoned at once. The breeder should not wait too long, since the strength of the mare rapidly fails and delay is dangerous.

The mare after foaling

If all is normal after foaling, the mare will usually get up and care for her foal. After she is on her feet there should be offered her a drink of gruel, made from a pound of fine oatmeal in half a bucket of water from which the chill has been taken. While the mare should be lightly worked up to the day of foaling, it is essential that she have a few days' rest after foaling; how long a rest she should have will depend on the condition of the mare and the foal, and on the financial circumstances

of the breeder. Strong mares that have recovered satisfactorily will be able to do light work in three or four days if need be, whereas others will need a rest of at least two weeks in order to recover from the shock. As soon as the mare is able, however, she should be given light exercise, since exercise is essential to the well-being of both mare and foal.

The foods given the brood mare when nursing her foal should be such as have a tendency to produce milk. Timothy hay and corn alone are not good milk-producing foods. The ration suggested above for the pregnant mare is better, and it could be much improved if a small quantity of succulent food, such as carrots, were fed with it. Many mares at best are poor milk-producers and they must be encouraged. Plenty of good, fresh grass is one of the best aids to healthy and abundant nutrition for both mare and foal.

The breeder should keep close watch of the mare's udder and the condition of the colt's bowels. If the bowels of the colt are loose and he is scouring, he may be having too much milk. In that case the mare should be partly milked by hand. If the colt is not taking all the milk, it is necessary for the breeder to milk the mare. Otherwise the udder will be greatly distended, will become sore, and may possibly cake, which will result in trouble for both mare and foal.

THE YOUNG FOAL

The young foal that makes its appearance normally and is bright and active needs only to be let alone. If proper attention is given to the food and the exercise of the mare, the foal should thrive without special care. Not all foals are equally fortunate, however. Occasionally one loses its life through want of attention at the

time of birth. Occasionally one is subject to digestive disorders that must be attended to and remedied at once before they prove fatal. Sometimes one is troubled with that infectious navel disease which may be due to unsanitary conditions at the time of foaling.

The foal's first meal

It is essential that the new-born foal receive the first milk from the dam. This foremilk appears thick and yellow, and is a natural purgative for the removal of

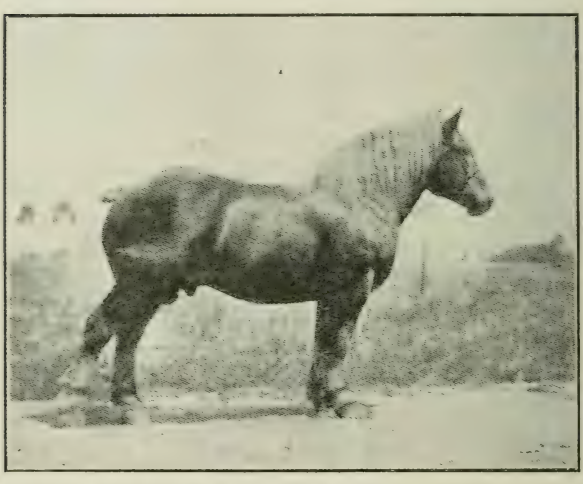

FIG. 6.—*Suffolk stallion, showing character.*

material that has accumulated in the foal's digestive tract during the last few days of its development. The prompt removal of such material is essential to the life of the colt. Sometimes the foremilk, or colostrum

as it is called, is drawn off as being unfit for the colt, but this practice is a common cause of death to the foal within two or three days after birth.

If the foal receives its first meal of colostrum within an hour after birth, it will ordinarily do well. Usually the bowels move within four to six hours. If the bowels do not move within twenty-four hours, and if the colt presents a droopy, listless appearance, it should be given two ounces of castor oil. Usually in four to six hours relief will have been gained and the appearance of the youngster will have changed greatly for the better.

Most breeders advise leaving the colt in the stable while the mare is at work ; others allow the colt to follow the mare into the field. Much depends on the nature of the work that the mare is doing. In some kinds of work the foals may follow without risk to mare or colt, while in other kinds, such as mowing hay or reaping grain, they cannot be allowed to follow. If the foal is kept in the barn, the mare may worry and fret and perhaps heat herself badly at first, but in time she will become accustomed to the separation.

A foal should never be allowed to draw milk when the mare is warm. On being brought in from work, the mare should be given a drink, but she should not be allowed to drink too much if she is warm or if the water is very cold. After she has cooled off and some of her milk has been drawn by hand, she may be turned into the stall with the colt with perfect safety to both.

Feeding the young foal by hand

It often happens that the milk of the mare is insufficient to promote healthy, vigorous growth in the foal, and occasionally it becomes necessary to raise a foal in-

dependently of the dam. In such cases the best addition to, or the best substitute for, the milk of the mare is that of a cow. The milk of the mare contains more sugar and less fat than does the milk of the cow. The breeder should therefore obtain milk from as fresh a cow as possible ; the poorer in fat the milk is, the better it will be for the foal, since mare's milk will average only about one and one-half per cent. fat, while the milk of most cows contains more than three per cent. Jersey milk should not be used for colts, since it is too rich in fat.

Patient effort will soon teach the colt to drink milk readily, but care must be taken that it does not receive too much at first. A half-pint is sufficient for a foal two or three days old, but the ration should be repeated often. If from the beginning it is necessary to feed the foal cow's milk, the milk should be modified. Four tablespoonfuls of lime-water should be put into a pint jar, which should then be filled with fresh cow's milk. A dessert-spoonful of white granulated sugar should be added for sweetening. The mixture must be warmed to blood heat and the foal should receive half a teacupful every hour at first. If the colt scours, a dose of two ounces of castor oil should be administered and the feed should be discontinued for two or three hours. As the colt grows older, the amount of food should be increased, and the frequency of feeding should be decreased first to twelve, then to nine, six, and lastly four times each day. The purpose is to give the foal all that it will drink, and to feed so often that it will not require a large quantity at a time.

Common disorders of the young foal

It sometimes happens that the newborn foal cannot breathe. In such a case, measures must be taken quickly

to establish the function of respiration by blowing violently up the nostrils and into the mouth, and by briskly rubbing the body. If breathing is slow, a few tablespoonfuls of brandy and water, given after the first few respirations, will be of material service in invigorating the low vital processes.

As soon as the mare has recovered from the shock of giving birth, she should be allowed to tend the foal, for it will be physically benefited thereby. If she refuses to dry and caress her foal, a little flour sprinkled over the back of the latter will often attract her to it. Should she still refuse, the foal must be dried with a soft flannel, aided to find the teat, and assisted to obtain its first meal.

Constipation.—Notwithstanding the purgative effects of the colostrum, or first milk, the young foal frequently suffers from constipation of the bowels, especially if the mare has not been in good health during the latter period of pregnancy. Sometimes the first milk of the dam will not agree with the young foal, or through weakness the foal may not have obtained a good draught. Whatever the cause, if the digestive tract has not been cleaned of its contents within twenty-four hours and if the foal presents a listless appearance, with eyes dull and ears drooping, it is necessary to stimulate the action of the bowels. Ordinarily the bowels will be stimulated to action by the administering of two ounces of olive oil or castor oil, and by an injection of warm water into the bowels. The water should be at blood heat and should have added to it a teaspoonful of glycerin and enough warm water to make four or five ounces—but no more, for only a small quantity is needed. This mixture should be injected gently into the rectum with an ordinary two-ounce, hard-rubber syringe. Care must be taken

not to rupture the tender membrane. This injection will lubricate the passage and induce the foal to endeavour to pass the fæcal matter, which is a yellowish, rather hard, waxy substance. If given as directed, the injection can do no harm and may be repeated every hour. In five hours relief will usually have been gained and the appearance of the youngster will have changed greatly for the better.

Diarrhœa, or scours.—This disease is rather prevalent among suckling animals and is often fatal. Although less subject to the disease than calves are, foals often die from it within a short period of time after birth. The causes are not certainly known. Ordinarily it is attributed to changes of an unknown character that take place in the composition of the milk. Two facts, however, have been determined : first, that the causes of scours are many and varied ; secondly, that their potency is increased by unclean surroundings, especially by unwholesome stables. Well-known causes are the non-removal of fæcal matter from the digestive tract of the foal, and nervous disorders that materially affect the health of the mare, such as a fretful condition when kept away from the colt soon after parturition. If the mare becomes feverish, the quality of her milk is altered, and the foal coming to her hungry gorges itself with the changed milk, which induces indigestion and diarrhœa.

Rich foods given to the mare may stimulate the flow of milk to such an extent that, if the foal is permitted to take all, digestive disorders and diarrhœa will follow. In early spring when the mare is pasturing on a rank growth of succulent grass, a similar condition is likely to result. For the same reason, a cold, damp bed or exposure to cold rainstorms is to be avoided. While

a passing shower, even if cold, may do no harm. prolonged exposure to rain and to a low temperature are likely to prove fatal to a newborn foal. Confinement in close buildings is objectionable to mare and foal alike; in both it induces a weakened condition and leaves the system an easy prey to disease.

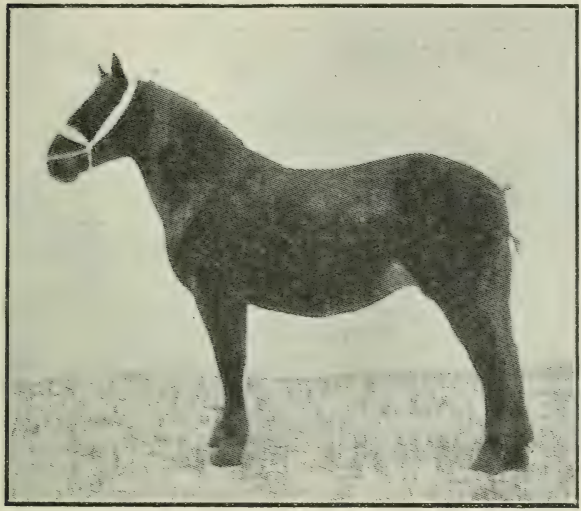

FIG. 7.—*Suffolk filly*

The best practice is to avoid conditions that are likely to cause such disorders. If the dam is properly fed and exercised, there is little danger. On the other hand, should digestive disorders appear, the foal must receive immediate attention and the cause must be removed; even then relief may come too late. When the attack

is due to an oversupply of rich milk, the dam should be milked in part by hand.

In administering treatment the nature of the difficulty should not be ignored. It is caused by an irritant in the stomach or the bowels that must be removed before a cure can be effected; hence the breeder should be cautioned against giving an astringent with a view

FIG. 8.—*Mares and foals at pasture.*

to cutting off the discharge. In all such cases the best practice is to expel the disturbance with a laxative, such as two ounces of castor oil, and later, after the irritant has been expelled, to check the discharge by a weak solution of gum arabic or slippery elm or by well-boiled linseed tea or starch. Even this treatment is beset by many a difficulty.

Navel infection.—Another disease common to young foals is the so-called navel infection, or joint disease. It should be understood that this disease is due to filth germs that gain access to the body of the foal by way of the open umbilical vein of the navel at birth. When these germs enter the body they set up irritation and inflammation; pus forms and is absorbed into the circulation from the navel abscess, and other abscesses are formed in all parts of the body, especially in the joints of the limbs. The foal is seen to have a swollen joint, and the breeder is likely to think that the mare caused the injury; other joints will soon be affected, however, and the condition may affect the throat and the poll as well. It is comparatively rare that an infected colt can be saved after the disease has reached the pus-forming stage.

It has been proved that simple hygienic measures will prevent the disease. The stall in which the mare foals should have every bit of old bedding, litter, and dirt removed, and the young foal should be born only on clean, fresh bedding. Perhaps it would be a safeguard to wash the stump of the umbilical cord—which should never be cut, but should be allowed to break of its own accord—with a saturated solution of boracic acid, and then to dust it with boracic-acid powder.

Feeding the foal

As soon as the foal is old enough it should be encouraged to nibble at grain, preferably oatmeal or wheat bran. It will begin to munch grain and hay at three or four weeks of age. If it is necessary that the foal have milk after it is two months old, skimmed milk should be substituted for the fresh milk of a cow. A colt should never be fed sour milk or milk from unclean vessels. Should there be any trouble from constipation,

it will be well to add about one half pint of oil meal to the ration each day. Oil meal can be fed with profit to growing colts, since it furnishes a large proportion of muscle-forming and bone-forming food. The effect of a ration consisting of sweet skimmed milk, ground oats, and oil meal on the growth and development of a foal is remarkable, and in all cases when the foal is likely to enter winter in low flesh such a ration cannot be too highly recommended.

Weaning the foal

Weaning depends rather on the preparation of the foal for leaving the dam than on the actual removal. The simplicity of the weaning process depends on the thoroughness of the preparation. If the foal has become accustomed to eating grain, if it has been permitted to take increasingly more as it grew, the process of weaning should not be difficult; for as the ration increases in amount of grain, it will decrease in the amount of milk consumed. When the time arrives for complete separation there will be little, if any, inconvenience or disturbance to either foal or dam. On the other hand, if the foal must learn to eat after having been deprived of its accustomed source of supply, it will require time to become adjusted to the new condition, and the mare will demand special care because of the removal of the colt before her milk supply has been gradually diminished.

Foals are usually weaned at four to six months of age. If the mare was bred soon after foaling and conceived, it is best to wean the foal early so that the mare will have time to recuperate and nourish the fœtus. If for any reason mare and foal are not doing well, it is perhaps best to wean comparatively early. If, on the

other hand, the mare has a full flow of milk and her services are not needed, there is no reason for weaning a foal under six months of age. When dam and foal are separated, it is better for both that the separation be complete. If, after they have become reconciled to the separation, they are permitted to see, hear, or smell each other, all the contentment that has been gained may be lost.

At the time of weaning, the food and the udder of the mare require special attention. The mare should be worked if she had previously been at work, but her grain ration should be reduced until she is dry. When the udder becomes so full as to cause her uneasiness, part of the milk should be drawn, but she should not be milked dry; if all the milk is withdrawn each time it will require a longer time for her to become dry. Care should also be taken to see that the new quarters where the weanling is confined are so constructed and arranged that it cannot injure itself while fretting over the separation from its mother.

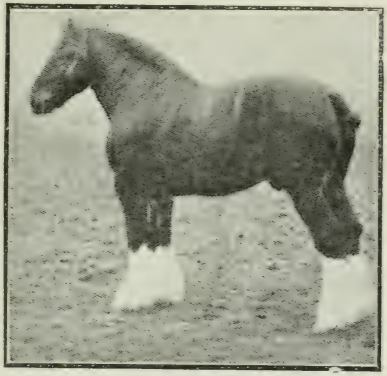

FIG. 9.—*Shire stallion, showing character.*

Skimmed milk may still be given to the colt, especially if the colt is not in good condition to enter the winter.

Clean, sound oats that have been ground constitute the best of all grains for the weanling. As cold weather approaches, the ration should consist of oats with one fourth part corn meal by weight, since the latter aids in producing fat and keeping up the animal heat. If a pint of oil meal is added to this mixture, the weanling will make good gains in spite of the cold weather and the separation from its mother. The breeder does not need to beware of too liberal feeding. During the first six months after weaning, many colts are permanently injured by too scanty a supply of food.

MANAGEMENT OF THE COLT

The notion is rather prevalent that colts should be permitted to rough it through all sorts of weather and on a scant quantity of coarse food, in order to develop hardiness and endurance, and that high feeding and good care may cause a colt which would otherwise be strong to grow into an unsound horse lacking hardiness and endurance. In many cases practical results have been such as to warrant this belief. It must not be concluded that there is anything injurious in generous and liberal feeding, or beneficial in starvation and exposure; but it should be evident that colts which are to attain sound and healthy development must always have pure air and abundant exercise.

Exercise and development

Abundance of fresh air and plenty of exercise are factors second in importance to no others in the raising of colts or horses. For this reason, working the brood mare both before and after foaling, working the stallion when possible, and permitting the foal to follow the dam into the field when convenient are practices to be

recommended. The colt needs opportunity for abundant exercise in pure air, uncontaminated by stable odours—an essential to the healthy development of all young animals. It is not sufficient that it be led out for

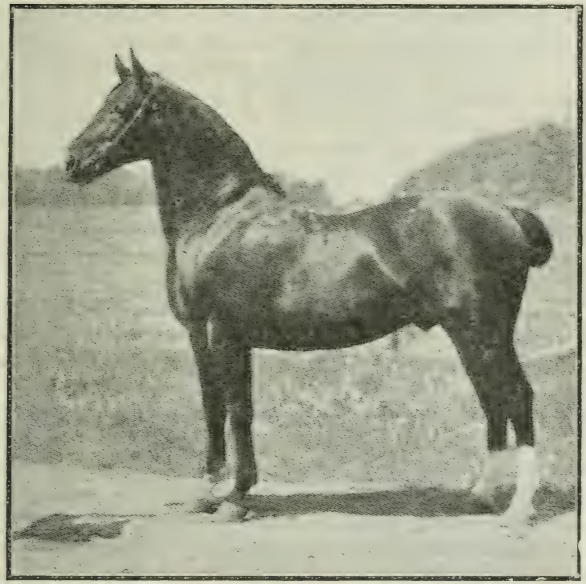

FIG. 10.—*French coach stallion, showing character.*

exercise at stated intervals. The foal needs an opportunity to romp and play in order that it may extend its muscles and expand its lungs to their utmost capacity, and send the blood coursing through its veins. Such

exercise is essential to a healthy, robust development of heart and lungs and bone and muscle, and nowhere can it be obtained in so great perfection as in the freedom of the open field. A colt that is kept in the stall and fed on heating grains is seldom given an opportunity for this health-giving exercise. It grows up a stiff, clumsy animal, deficient in stamina and vigour. Breeders who follow the best practice promote the growth of the colt by an abundance of nutritious food, and further a healthy and perfect development by permitting it to romp, race, and play at will. If this practice is followed, all that is good in roughing will be attained and all that is dangerous in generous feeding will be avoided.

Care of the colt's feet

The feet of the growing colt should be properly cared for. If left to nature, the feet do not always become full, strong and perfect. On stone or gravel, the foot wears off as fast as is necessary to keep it in fair proportions, but the wearing is not even. For this reason the feet of the colt should be carefully inspected once each month. As a rule it will be necessary to shorten the toes. The rasp is the only instrument that should be used for this purpose. When the toes are kept short the quarters will usually care for themselves, for the frogs will bear on the ground and keep the heels properly spread. The frog needs special attention, for if it does not come in contact with the bearing surface the foot will rapidly lose its shape, the heels will contract, and the walls at the quarter will become brittle, weak, and easily split both from above and from below. A split from above is difficult to check without firing or blistering; it is therefore important to protect the walls. The sole

need not be cut in order to "open the heels." The walls should be kept rounded at the ground surface, the toe short, and the frog prominent.

A horse becomes unsound of limb when the weight of its burden is not equally distributed. Equal distribution of weight-bearing is possible only when the form of the foot and the direction of the limb are correct. Deviation from the proper standing position will cause a proportionate overtaxing of certain parts, resulting in unsoundness.

Sound feet are best produced by feeding nutritious food. Sudden changes of the food, periods of sickness, and exposure to cold, damp weather for months at a time have an injurious effect on the feet. Hence the colt should be fed regularly and generously, should be well sheltered, and should be protected as much as possible against the ravages of disease.

Castrating the male foal

There is a great difference of opinion regarding the best time to castrate the male foal. The work to which the colt is to be put, as well as the nature of the individual, is a factor to be considered. The longer he is left entire, the more masculine in appearance he will become. An animal that is castrated when young seldom develops an attractive head and neck. The longer he is left entire, the heavier and stronger his head, neck and shoulders will become and the more courageous he will be. If, therefore, the colt is rather underdeveloped about the head and the neck and is rather timid in his nature, he may be left entire for six months, or even a year, longer than one that is overdeveloped and inclined to be vicious.

It is customary to castrate the foal when he is between

one and two years of age. If let go too long he becomes staglike in appearance. Frequently it is desirable to castrate a stallion after he has performed services in a stud, but many owners are deterred from this practice by a mistaken idea as to the dangers of the operation and its probable effect on the temperament of the horse. The idea that castrating a horse will make him lazy and sluggish is entirely erroneous. The damages are slight, for the castration of a horse at any age is a simple operation ; no injurious results need be expected when the operation is performed by a qualified practitioner.

Winter management

Weanlings should have snug quarters during their first winter. Preferably two of them should occupy a box-stall. They should be fed ground oats and bran—one fifth bran by weight—to which a little oil meal has been added in order to keep them in good physical condition. They should receive all the food that they will eat so long as they come back hungry for the next meal. Weanlings will eat three to five pounds of grain daily ; yearlings, about seven pounds ; and two-year-olds, about nine pounds. The grain ration of yearlings and two-year-olds may consist of corn meal, ground oats, and wheat bran, mixed equal parts by weight. Only the best hay should be fed, and that which is dusty and mouldy should be avoided. Weanlings will consume daily approximately seven pounds of hay ; yearlings, eighteen pounds; and two-year-olds, about twenty pounds. These figures represent averages ; draught colts consume somewhat larger quantities, whereas lighter colts may consume considerably less. Colts that have free run of a small paddock in which they may romp and play will develop into strong, vigorous animals of undaunted courage and great endurance.

Too frequently colts are neglected and allowed to rough it from the time when they are weaned until they are caught to be broken. Many a breeder has failed of success by neglecting the colt. He has forgotten that all our improved breeds of horses are the product of adequate nutrition, as well as intelligent breeding, suitable environment, sufficient shelter, and kindly care. Many colts are thus stunted for the first winter, and no amount of feeding and care later on can fully retrieve such neglect.

In general, it may be said that when the colt is properly reared he will make approximately half his growth the first year. Of course, there will be exceptions to this rule, but it will hold on the average when colts are cared for as suggested.

Summer management

On pasture, yearlings and two-year-olds should have grain according to the season and the growth of the grass. They should be kept growing, but not too fat. They should have shelter into which they may escape from the attacks of flies; it is difficult for colts to thrive when flies are prevalent unless this is done. Colts should not share a field with cattle, sheep, and swine if it can be avoided; they do best by themselves. The stallion colts will have to be kept apart from the mare colts after they are one year old; many a foal has been got by a yearling. Colts cared for in this way will not prove a disappointment to their owners, nor will the breeder lose interest in the business in which he is engaged. To see the colts thriving will ever prove a source of enjoyment as well as of profit.

TRAINING THE COLT

The colt should become familiar with man while young. In the very beginning he should be taught subordination

and should not be allowed to become wilful or headstrong. The usefulness of the horse will depend much on his courage and fearlessness, and it is in order to promote these characteristics that the colt should become familiar with man at as early an age as possible. If taken in time and properly handled, he need never know fear. A colt should never be frightened. Too many persons thoughtlessly try to tease the young colt by running at it or throwing sticks at it—practices which should never be indulged if a reliable animal is to be developed. The colt should be taught useful lessons only. Because colts are bright and susceptible to training, they are often taught tricks and allowed to become mischievous. A colt that bites, rears, or kicks may seem amusing at first, but this very behaviour may later prove an annoyance that is difficult to overcome. The trainer should not make the mistake of trying to teach the colt too much at a time; he should be sure that it understands each lesson thoroughly before another is attempted. On the other hand, colts should be trained continuously day by day, and not merely at the convenience of the trainer. The trainer should be gentle and firm at all times and should accomplish whatever he attempts to accomplish.

Teaching the foal to lead

The foal should be taught very early the uses of the halter, first to lead, then to drive. But even before haltering, the colt may be taught to stand over, to have his foot raised, and to back. In handling the colt the trainer should be careful about the ears, the back of the forelegs, and the flanks, as these parts are often very sensitive. The colt should be caught by putting one hand under the neck and the other under the hams or

around the buttocks ; he should never be caught around the neck alone, for if this is done he will go backward and perhaps fall. If he attempts to go forward, press back with the hand under his neck ; and if he attempts to go backward, press forward with the hand around the but-

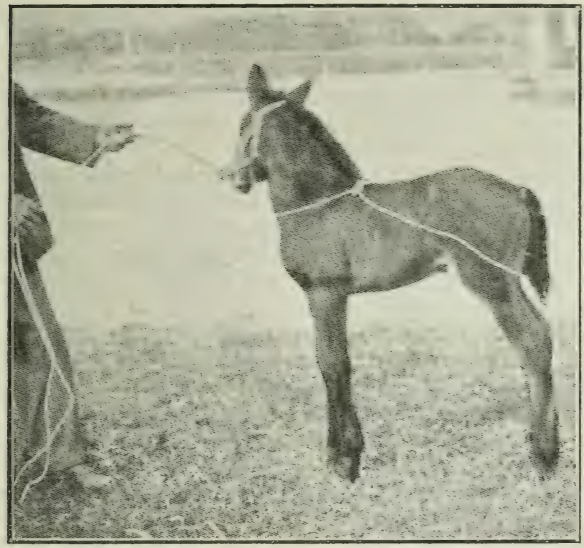

FIG. 11.—*Teaching the foal to lead.*

tocks. Colts caught in this way will allow persons to walk up to them, whereas if they are caught around the neck there may be difficulty in catching them (Fig. 1).

When the foal is to be haltered, a strong, well-fitting

halter should be chosen ; it should not be a new one that smells strangely to the colt, but one that has recently been used. Care should be taken not to pull heavily on the nose band at any time ; occasionally deformed face lines and imperfect necks are caused by this means. It is not necessary to drag a colt by the halter in order to suggest to him that his business is to follow. After such treatment, the reverse effect is usual ; the harder the colt is pulled, the harder he pulls back. If, on the contrary, he is coaxed along the accustomed route, for example to the watering trough and back, he will soon follow promptly.

If he continues to resist, however, other means must be tried. At all events the trainer should not stand in front of the colt and try to pull his head forward, for he will roll his eyes, shake his head, and step back. Advantage must be taken of the colt's natural tendency to step forward when pressure is brought to bear on the buttocks. A small rope, the size of a sash cord and about ten feet long, with a noose or a ring at one end, should be placed gently over the colt's back just in front of the hips, with the noose or the ring on the underside of the body. When the other end of the rope is run through the noose, the rope can be closely drawn around the flanks, passed along under the body between the forelegs, and then up through the ring in the halter. This is called the loin hitch. The trainer should pull gently on the halter strap with one hand, and, as the colt begins to shake his head, give the light rope a sharp pull with the other hand ; the colt will immediately step forward. If the colt is given time to become used to the lesson, he will soon follow wherever he is led. Some trainers prefer the quarters hitch rather than the loin hitch (Fig. 11).

Teaching the foal to drive

After the colt understands the uses of the halter and will lead, he may be taught to drive with reins. In order to do this successfully, a surcingle properly adjusted is required. The surcingle must be provided with loops or rings on each side, placed well below the centre of the body; the lines should be passed through these and fastened to the rings on either side of the halter; a bit should never be used in the mouth of a very young colt. Now the lines will pass low on the hind quarters and thus prevent the colt from turning with his head toward the trainer. It is very important to hold the reins low in turning, in order to make the guiding process easy. As the colt becomes accustomed to being driven, he can be touched with the lines and guided to the right or the left; he should be stopped often in order to give him confidence.

There are two objections to training colts while young: first, because of lack of time on the part of the owner; and secondly, because after having been trained, the young animals are likely to be driven or put to hard labour before they are properly developed. For these reasons colts are usually allowed to enjoy their independence until such time as they are fit to work, and in many cases their general usefulness is much impaired by such practice. A horse should be reasonably mature before he is put to service, but time spent on his education prior to the date at which he goes to work will be repaid manyfold in the more satisfactory manner in which he will perform his service.

Training to the uses of the bit.—It is perhaps best to train the horse to the uses of the bit when he is about two years of age. The manner in which the horse is educated to the uses of the bit will go far toward deter-

mining his usefulness. Inasmuch as the master's desire is conveyed to the mind of the horse through the medium of hands, reins, bit and mouth, no progress can be made, and none should be attempted, until this means of communication has been established.

Importance of a good mouth.—No other factor contributes so much to the pleasure, comfort, and safety of the driver of a horse as a responsive mouth that promptly obeys the slightest instruction from the master. In general a good mouth is natural to the horse. A bad mouth usually results from improper handling, and often is the cause of many other imperfections, such as a tongue lolling, crossing the jaws, hobbling, and irregular and unsteady gaits, many of which, when well established, are difficult to overcome.

Bitting the colt.—The young animal can usually be made familiar with the uses of the bit by the application of the bitting harness, or dumb jockey as it is sometimes called. This bitting harness consists of an open bridle, with large, smooth bit, a check-rein, surcingle and crupper, and two side lines running from the bit to buckles on either side of the surcingle. The adjustment of the bridle is important. The length of the headstall must be so adjusted as to bring the bit in mild contact with the bars of the mouth. If the headstall is too short, the bars and the corners of the mouth soon become sore and the animal may become vicious; on the other hand, if it is too long, the bit drops down in the mouth and the animal becomes careless. With the bitting harness properly adjusted, the colt may be turned into the familiar open paddock in order to become accustomed to having the bit in his mouth. The check-rein and the side reins should be left slack at first. Gradually from day to day the reins should be shortened, although care

must be taken that they are never made so short as to place the head in an uncomfortable position, or to tighten the bit and make the corners of the mouth sore. During a few hours each day for perhaps a week or less, the colt should be subjected to the use of this apparatus. The

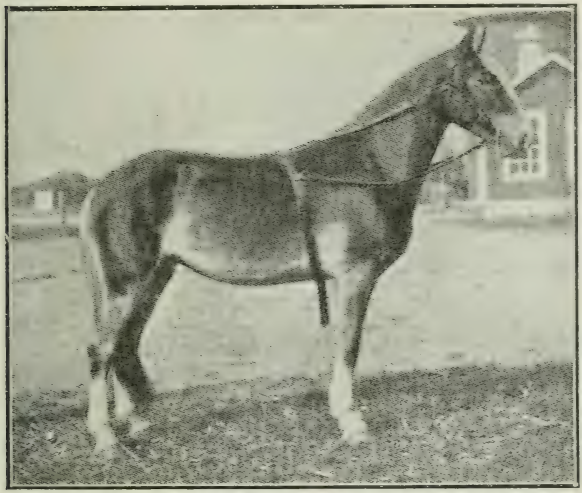

FIG. 12.—*Bitting harness, for teaching the use of the bit.*

side reins may now be substituted for real lines, and the colt may be driven until he knows how to guide this way and that, to stop at the word "whoa," and to step forward at the command "get up." He should be trained to stand absolutely still when he is being harnessed or saddled, or at any time when it is desired that he should do so. A horse that is continually step-

ping about while being harnessed is but half-trained. The trainer should be gentle at all times, but he should accomplish everything that is undertaken.

Poling the colt.—Before being harnessed or hitched, the colt should be made familiar with the pressure caused by the harness and the shafts. In order to do this, a light pole, eight to ten feet long, should be held for the colt to smell and to touch with his nose. The pole should be rubbed gently over the nose, the side of the face, and up to the mane and crest. After scratching the crest the pole should be brought back to the withers, down over the shoulders, and along the outside and inside of the forelegs. The pole should then pass along the back to the hind quarters, and down along the outside and the inside of the hind legs. The process should be repeated, first on one side and then on the other, and every part of the body should be touched, until the colt becomes perfectly submissive.

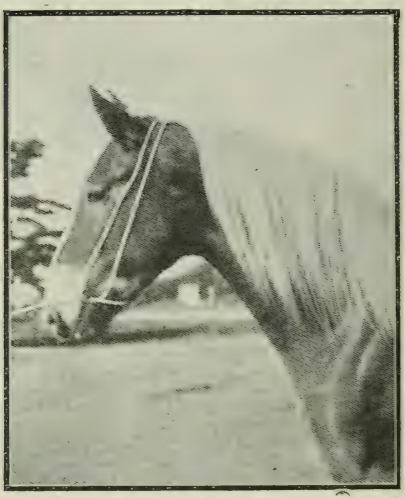

FIG. 13.—*War bridle, for leading vicious horses.*

Harnessing the colt.—After the colt has become familiar with the bitting apparatus and has learned to obey simple commands, he may be harnessed. Harness that has been in constant use, preferably by a horse that the colt knows, is desirable; new harness, smelling unfamiliar to the colt, must not be used. After the colt has been driven with the bitting apparatus and has become rather tired, he should be placed in his stall, the collar should be brought to him, and he should be allowed to smell it if he likes; then it should be adjusted as if he were an old horse. The trainer should take the harness, walk up to the colt, and lift it gently over his back. He should not stand off and throw the harness over the colt's back, for the loose straps, hitting the back and the abdomen, will be resented and the colt may kick. After the harness is adjusted the trainer should walk behind the colt, put the crupper strap on, and step to the side and fasten the bands.

FIG. 14.—*Guy line for leading vicious horses.*

The harness should be of good quality and in good repair, and should fit perfectly ; if a part breaks, the colt may be ruined for all time. The collar should receive special attention, since it is through this agency that the horse exerts his power, and the colt's shoulders are likely to be tender and easily abraded. The collar must be kept scrupulously clean. If the colt loses flesh, the collar which fitted perfectly in the beginning may become too large. A breast collar is admissible when the load is light. It must not be adjusted so high as to choke the animal, nor should it be so low as to interfere with the action of his limbs. The saddle and the crupper also need careful attention. Care should be taken to have them fit and to keep them clean, lest they abrade the back or the tail and render a horse vicious.

Hitching single.—When the colt is desired for single use, it is often advisable to train him to go single from the first. This may be done after he has become familiar with the bit, the harness, and the use of the lines. When training the colt to go single, a training cart, substantially constructed with long shafts and with a seat so arranged that the driver can mount and dismount quickly, should be employed. Such a cart can easily be constructed from the rear wheels and the axle of a buggy or a carriage by fastening two long poles (of hickory, or any tough, springy wood) to the axle, a crossbar and a whiffletree in front, and a board seat in the rear. The shafts should be twelve or fourteen feet long, with provision at the ends for the attachment of a strap across from point to point in order to prevent the colt in rearing from throwing his front leg over the end of the shaft. At first a kicking strap attached to each shaft and passed over the colt's rump should be used, at least until the colt is accustomed to the shafts. When the colt is first hitched, an assistant

should hold him until the driver is ready, and then he should be allowed to go. As soon as he has become familiar with the vehicle, he should be taught to stand still until he is told to go.

Training the colt to walk fast.—There is no gait more valuable, more appreciated and more practically useful in a horse than a fast, square walk. It is not difficult to train the average colt to walk fast, provided the proper methods are employed in early training. From the very beginning the colt should be walked as swiftly as he is able to walk, in order that he may form the habit of fast walking. He should never be allowed to mope along, or the habit will become strongly fixed.

Training vicious horses

In training or handling vicious horses, it is important to impress them firmly with the idea that the trainer

FIG. 15.—*Colt hitched for the first time, showing Rarey single safety and kick strap.*

has complete control over them and that they must obey. There are several ways of conveying this idea. Perhaps the most effective means is to contrive a self-punishing harness. With such a harness the vicious horse deals out his own punishment at the instant he violates his trainer's wish. While many appliances have been devised for the control of vicious horses, perhaps that invented by Mr. Rarey and used in his so-called "Rarey system" is as effective as any. This harness consists of two short straps fitted with D-shaped rings, a surcingle and a long rope. The straps are buckled around the front pasterns and the surcingle around the body. One end of the rope is tied into the ring in the strap that goes around the pastern of the left, or near, front foot. The free end is then passed through a ring on the underside of the surcingle and down through the ring at the other pastern. Then the rope end is brought up and passed through a ring, tied about halfway down the right, or off, side of the surcingle. If the animal becomes unruly it is necessary only to pull on the rope, which brings his front feet up to his chest, and the animal comes down on his knees and his nose. A few hard falls will usually teach the most incorrigible, but such a dangerous practice should be followed only as a last resort and after all other means have failed. It sometimes happens that horses permanently injure their knees or even break their necks as a result of a fall.

By the application of such methods, the most vicious animals can ordinarily be brought under control. If the horse with a disposition to kick, rear, bolt, buck, or run can be persuaded that he is merely punishing himself, he will soon understand that he must not indulge in such practices. It should be remembered, however, that such animals are not trustworthy and should never be left to the care of persons incompetent to meet an emergency.

PRACTICAL HORSE-BREEDING

DISCUSSION PAPER

The Discussion Paper is planned to help the student by drawing his attention to the important points of the subject he is studying. It is intended to develop thought and self-expression of his own ideas. Each Discussion Paper, when answered and returned, is carefully read by the staff of the Department of Agriculture and a personal statement is given in connection with any question that the reader thinks the student has not fully understood. The student is invited to ask any questions that will help to give him a more complete understanding of the Course.

GENERAL INSTRUCTIONS

1. Always express your ideas in your own words.
2. Finish one paper at a time.
3. See that the subject is placed at the top of the first page of each paper answered.
4. Do not forget to write your NAME, NUMBER and COMPLETE ADDRESS, on each set of answers.
5. Number each question, and also each sheet, and pin them together in their right order.
6. Send in each paper as soon as completed.

QUESTIONS

1. How would you arrange to have sufficient horse labour during the busy season of the year and also make the horses earn their keep during the slack season ?
2. Describe how you would make use of the principle of heredity that "like produces like" in breeding draught horses ?
3. Discuss three important factors that should be considered in selecting the stallion.
4. Describe a mare that you would consider suitable for breeding purposes. Mention hereditary forms of unsoundness and blemishes which should always be avoided.
5. Discuss the breeding period in a mare's life, giving reasons for or against breeding two-year-old fillies. When would you dispose of a good brood mare on account of age ? Give your reasons.
6. From your knowledge of horse-breeding would you raise most of your foals in the spring or in the autumn ? Give your reasons.
7. Give a brief account of the care and management of mares at breeding time and throughout pregnancy.
8. What precautions should be taken at the time of foaling, and what special care should the mare and foal receive during the following week ?
9. Describe briefly the management and education a colt should have until properly broken to harness.
10. Discuss methods that have been devised to control vicious horses.